

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

Development Steps Completed:

1. SAC authorized posting TTC/ATC/AFC SAR development June 20, 2005.
2. SAC authorized the SAR to be development as a standard on February 14, 2006.
3. SC appointed a Standard Drafting Team on March 17, 2006.
4. SDT posted second first for comment from May 25–June 25, 2007
5. SDT posted second draft for comment from October 31–December 14, 2007.

Description of Current Draft:

This is the third and final draft of the proposed standard posted for stakeholder comments. This draft includes consideration of stakeholder comments and applicable FERC directives from FERC Order 693, Oder 890, and Order 890-A.

Future Development Plan:

| Anticipated Actions | Anticipated Date |
|------------------------------------------|-------------------------|
| 1. First ballot of standard. | March 7, 2008 |
| 2. Respond to comments. | April 22, 2008 |
| 3. Recirculation ballot. | April 22, 2008 |
| 4. 30 Day posting before board adoption. | March 7, 2008 |
| 5. Board adopts MOD-001-1. | May 5, 2008 |

Definitions of Terms Used in Standard

This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

Rated System Path Methodology: The Rated System Path Methodology is characterized by an initial Total Transfer Capability (TTC), determined via simulation. Capacity Benefit Margin, Transmission Reliability Margin, and Existing Transmission Commitments are subtracted from TTC to derive Available Transfer Capability. Under the Rated System Path Methodology, TTC results are generally reported as specific transmission path capabilities.

A. Introduction

1. **Title:** **Rated System Path Methodology**
2. **Number:** **MOD-029-1**
3. **Purpose:** To increase consistency and reliability in the development and documentation of transfer capability calculations for short-term use performed by entities using the Rated System Path Methodology to support analysis and system operations.
4. **Applicability:**
 - 4.1. Each Transmission Operator that uses the Rated System Path Methodology to calculate Total Transfer Capabilities (TTCs) for ATC Paths.
 - 4.2. Each Transmission Service Provider that uses the Rated System Path Methodology to calculate Available Transfer Capabilities (ATCs) for ATC Paths.
5. **Proposed Effective Date:** First day of the first calendar quarter that is twelve months beyond the date that MOD-001-1, MOD-028-1, MOD-029-1, and MOD-030-1 are approved by applicable regulatory authorities, or in those jurisdictions where regulatory approval is not required, the standard becomes effective on the first day of the first calendar quarter that is twelve months beyond the date the set of standards is approved by the NERC Board of Trustees.

B. Requirements

- R1. When calculating TTCs for ATC Paths, the Transmission Operator shall use a Transmission model which satisfies the following requirements: [*Violation Risk Factor: Medium*] [*Time Horizon: Operations Planning*]
 - R1.1. The model utilizes data and assumptions consistent with the time period being studied and that meets the following criteria:
 - R1.1.1. Includes at least:
 - 1.1.1.1. The Transmission Operator area.
 - 1.1.1.2. All Transmission Operator areas contiguous with its own Transmission Operator area.
 - 1.1.1.3. Any other Transmission Operator area linked to the Transmission Operator's area by joint operating agreement.
 - R1.1.2. Models all system Elements as in-service for the assumed initial conditions.
 - R1.1.3. Models all generation Facilities larger than 20 MVA in the studied area.
 - R1.1.4. Models phase shifters in non-regulating mode, unless otherwise specified in the ATCID.
 - R1.1.5. Uses Load forecast by Balancing Authority.
 - R1.1.6. Uses Transmission Facility additions and retirements.

- R2.7.** For ATC Paths whose path rating, adjusted for seasonal variance, was established, known and used in operation since January 1, 1994, and no action has been taken to have the path rated using a different method, set the TTC at that previously established amount.
- R2.8.** Create a study report that describes the steps above that were undertaken (R2.1 – R2.7), including the contingencies and assumptions used, when determining the TTC and the results of the study. Where three phase fault damping is used to determine stability limits, that report shall also identify the percent used and include justification for use unless specified otherwise in the ATCID.
- R3.** Each Transmission Operator shall establish the TTC at the lesser of the value calculated in R2 or any System Operating Limit (SOL) for that ATC Path. [*Violation Risk Factor: Medium*] [*Time Horizon: Operations Planning*]
- R4.** Within seven calendar days of the finalization of the study report, the Transmission Operator shall make available to the Transmission Service Provider of the ATC Path, the most current value for TTC and the TTC study report documenting the assumptions used and steps taken in determining the current value for TTC for that ATC Path.
- R5.** When calculating ETC for firm Existing Transmission Commitments (ETC_F) for a specified period for an ATC Path, the Transmission Service Provider shall use the algorithm below: [*Violation Risk Factor: Medium*] [*Time Horizon: Operations Planning*]

$$ETC_F = NL_F + NITS_F + GF_F + PTP_F + ROR_F + OS_F$$

Where:

NL_F is the firm capacity set aside to serve peak Native Load forecast commitments for the time period being calculated, to include losses, and Native Load growth, not otherwise included in Transmission Reliability Margin or Capacity Benefit Margin.

NITS_F is the firm capacity reserved for Network Integration Transmission Service serving Load, to include losses, and Load growth, not otherwise included in Transmission Reliability Margin or Capacity Benefit Margin.

GF_F is the firm capacity set aside for grandfathered Transmission Service and contracts for energy and/or Transmission Service, where executed prior to the effective date of a Transmission Service Provider's Open Access Transmission Tariff or "Safe Harbor Tariff" accepted by FERC.

PTP_F is the firm capacity reserved for confirmed Point-to-Point Transmission Service.

ROR_F is the firm capacity reserved for Roll-over rights for contracts granting Transmission Customers the right of first refusal to take or continue to take Transmission Service when the Transmission Customer's Transmission Service contract expires or is eligible for renewal.

OS_F is the firm capacity reserved for any other service(s), contract(s), or agreement(s) not specified above using Firm Transmission Service as specified in the ATCID.

- R6.** When calculating ETC for non-firm Existing Transmission Commitments (ETC_{NF}) for all time horizons for an ATC Path the Transmission Service Provider shall use the following algorithm: [*Violation Risk Factor: Lower*] [*Time Horizon: Operations Planning*]

$$ETC_{NF} = NITS_{NF} + GF_{NF} + PTP_{NF} + OS_{NF}$$

Where:

NITS_{NF} is the non-firm capacity set aside for Network Integration Transmission Service serving Load (i.e., secondary service), to include losses, and load growth not otherwise included in Transmission Reliability Margin or Capacity Benefit Margin.

GF_{NF} is the non-firm capacity set aside for grandfathered Transmission Service and contracts for energy and/or Transmission Service, where executed prior to the effective date of a Transmission Service Provider’s Open Access Transmission Tariff or “Safe Harbor Tariff” accepted by FERC.

PTP_{NF} is non-firm capacity reserved for confirmed Point-to-Point Transmission Service.

OS_{NF} is the non-firm capacity reserved for any other service(s), contract(s), or agreement(s) not specified above using non-firm transmission service as specified in the ATCID.

- R7.** When calculating firm ATC for an ATC Path for a specified period, the Transmission Service Provider shall use the following algorithm: [*Violation Risk Factor: Medium*] [*Time Horizon: Operations Planning*]

$$ATC_F = TTC - ETC_F - CBM - TRM + Postbacks_F + Counterflows_F$$

Where

ATC_F is the firm Available Transfer Capability for the ATC Path for that period.

TTC is the Total Transfer Capability of the ATC Path for that period.

ETC_F is the sum of existing firm commitments for the ATC Path during that period.

CBM is the Capacity Benefit Margin for the ATC Path during that period.

TRM is the Transmission Reliability Margin for the ATC Path during that period.

Postbacks_F are changes to firm Available Transfer Capability due to a change in the use of Firm Transmission Service for that period, as defined in Business Practices.

Counterflows_F are adjustments to firm Available Transfer Capability as determined by the Transmission Service Provider and specified in their ATCID.

- R8.** When calculating non-firm ATC for an ATC Path for a specified period, the Transmission Service Provider shall use the following algorithm: [*Violation Risk Factor: Lower*] [*Time Horizon: Operations Planning*]

$$ATC_{NF} = TTC - ETC_F - ETC_{NF} - CBM_S - TRM_U + Postbacks_{NF} + Counterflows_{NF}$$

Where:

ATC_{NF} is the non-firm Available Transfer Capability for the ATC Path for that period.

TTC is the Total Transfer Capability of the ATC Path for that period.

ETC_F is the sum of existing firm commitments for the ATC Path during that period.

ETC_{NF} is the sum of existing non-firm commitments for the ATC Path during that period.

CBM_S is the Capacity Benefit Margin for the ATC Path that has been scheduled during that period.

TRM_U is the Transmission Reliability Margin for the ATC Path that has not been released for sale (unreleased) as non-firm capacity by the Transmission Service Provider during that period.

Postbacks_{NF} are changes to non-firm Available Transfer Capability due to a change in the use of Non-Firm Transmission Service for that period, as defined in Business Practices.

Counterflows_{NF} are adjustments to non-firm Available Transfer Capability as determined by the Transmission Service Provider and specified in its ATCID.

C. Measures

- M1.** Each Transmission Operator that uses the Rated System Path Methodology shall produce any Transmission model it used to calculate TTC for purposes of calculating ATC for each ATC Path, as required in R1, for the time horizon(s) to be examined. (R1)
- M1.1.** Production shall be in the same form and format used by the Transmission Operator to calculate the TTC used in its ATC calculations, as required in R1. (R1)
- M1.2.** The Transmission model produced must include the areas listed in R1.1.1 (R1.1)
- M1.3.** The Transmission model produced must show the use of the modeling parameters stated in R1.1.2 through R1.1.10; except that, no evidence shall be required to prove: 1) utilization of a Special Protection System where none was included in the model or 2) that no additions or retirements to the generation or Transmission system occurred. (R1.1.2 through R1.1.10)
- M1.4.** The Transmission Operator must provide evidence that the models used to determine TTC included Facility Ratings as provided by the Transmission Owner and Generator Owner. (R1.2)

- M2.** Each Transmission Operator that uses the Rated System Path Methodology shall produce the ATCID it uses to show where it has described and used additional modeling criteria in its ACTID that are not otherwise included in MOD-29 (R1.1.4, R.1.1.9, and R1.1.10).
- M3.** Each Transmission Operator that uses the Rated System Path Methodology with paths with ratings established prior to January 1, 1994 shall provide evidence the path and its rating were established prior to January 1, 1994. (R2.7)
- M4.** Each Transmission Operator that uses the Rated System Path Methodology shall produce as evidence the study reports, as required in R.2.8, for each path for which it determined TTC for the period examined. (R2)
- M5.** Each Transmission Operator shall provide evidence that it used the lesser of the calculated TTC or the SOL as the TTC, by producing: 1) all values calculated pursuant to R2 for each ATC Path, 2) Any corresponding SOLs for those ATC Paths, and 3) the TTC set by the Transmission Operator and given to the Transmission Service Provider for use in R7 and R8 for each ATC Path. (R3)
- M6.** Each Transmission Operator shall provide evidence (such as logs or data) that it provided the TTC and its study report to the Transmission Service Provider within seven calendar days of the finalization of the study report. (R4)
- M7.** Each Transmission Service Provider shall produce the algorithms it used to calculate ETCs for Firm and Non-Firm Transmission Service, as required in R5 and R6, showing that only the variables allowed in R5 and R6 were used to calculate ETCs. Note that variables may legitimately be zero if the value is not applicable or calculated to be zero. (R5 and R6)
 - M7.1.** Production of the algorithms shall be in the same form and format used by the Transmission Service Provider to calculate ETCs in R5 and R6. (R5 and R6)
- M8.** Each Transmission Service Provider shall produce the algorithms it used to calculate firm and non-firm ATCs, as required in R7 and R8, showing that only the variables allowed in R7 and R8 were used to calculate ATCs. Note that variables may legitimately be zero if the value is not applicable or calculated to be zero. (R7 and R8)
 - M8.1.** Production of the algorithms shall be in the same form and format used by the Transmission Service Provider to calculate ATCs in R7 and R8. (R7 and R8)

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

Regional Entity.

1.2. Compliance Monitoring Period and Reset Time Frame

Not applicable.

1.3. Data Retention

- The Transmission Operator shall have its latest models used to determine TTC for R1. (M1)
- The Transmission Operator shall have the current, in force ATCID(s) provided by its Transmission Service Provider(s) and any prior versions of the ATCID that were in force since the last compliance audit to show compliance with R1. (M2)
- The Transmission Operator shall retain evidence of any path and its rating that was established prior to January 1, 1994. (M3)
- The Transmission Operator shall retain the latest version and prior version of the TTC study reports to show compliance with R2. (M4)
- The Transmission Operator shall retain evidence for the most recent three calendar years plus the current year to show compliance with R3 and R4. (M5 and M6)
- The Transmission Service Provider shall retain evidence for the most recent three calendar years plus the current year to show compliance with R5, R6, R7 and R8. (M7 and M8)
- If a Transmission Service Provider or Transmission Operator is found non-compliant, it shall keep information related to the non-compliance until found compliant.
- The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

1.4. Compliance Monitoring and Enforcement Processes:

The following processes may be used:

- Compliance Audits
- Self-Certifications
- Spot Checking
- Compliance Violation Investigations
- Self-Reporting
- Complaints

1.5. Additional Compliance Information

None.

2. Violation Severity Levels

| R # | Lower VSL | Moderate | High VSL | Severe VSL |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| R1. | <p>The Transmission Operator met all but one of the modeling requirements specified in R1.1.</p> <p style="text-align: center;">OR</p> <p>The Transmission Operator utilized one to ten Facility Ratings that were different from those specified by a Transmission Owner or Generation Owner in their Transmission model.</p> <p>A modeling error (a violation of the criteria in R1) is a single violation, regardless how many times that error has been modeled.</p> | <p>The Transmission Operator met all but two of the modeling requirements specified in R1.1.</p> <p style="text-align: center;">OR</p> <p>The Transmission Operator utilized eleven to twenty Facility Ratings that were different from those specified by a Transmission Owner or Generation Owner in their Transmission model.</p> <p>A modeling error (a violation of the criteria in R1) is a single violation, regardless how many times that error has been modeled.</p> | <p>The Transmission Operator met all but three of the modeling requirements specified in R1.1.</p> <p style="text-align: center;">OR</p> <p>The Transmission Operator utilized twenty-one to thirty Facility Ratings that were different from those specified by a Transmission Owner or Generation Owner in their Transmission model.</p> <p>A modeling error (a violation of the criteria in R1) is a single violation, regardless how many times that error has been modeled.</p> | <p>The Transmission Operator did not meet four or more of the modeling requirements specified in R1.1.</p> <p style="text-align: center;">OR</p> <p>The Transmission Operator utilized more than thirty Facility Ratings that were different from those specified by a Transmission Owner or Generation Owner in their Transmission model.</p> <p>A modeling error (a violation of the criteria in R1) is a single violation, regardless how many times that error has been modeled.</p> |
| R2 | N/A | N/A | N/A | The Transmission Operator did not calculate TTC using the process described in R2. |
| R3. | The Transmission Operator did not specify the TTC as the lesser of the TTC calculated using the process described in R4 or any associated SOL for the larger of 1 ATC Path OR more than 0% but less than 1% of all ATC Paths | The Transmission Operator did not specify the TTC as the lesser of the TTC calculated using the process described in R4 or any associated SOL for the larger of 2 ATC Paths OR 1% or more but less than 2% of all ATC Paths. | The Transmission Operator did not specify the TTC as the lesser of the TTC calculated using the process described in R4 or any associated SOL for the larger of 3 ATC Paths OR 2% or more but less than 5% of all ATC Paths. | The Transmission Operator did not specify the TTC as the lesser of the TTC calculated using the process described in or any associated SOL, for the larger of 4 or more ATC Paths OR 5% or more of all ATC Paths. |

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| R # | Lower VSL | Moderate | High VSL | Severe VSL |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| R4. | The Transmission Operator provided the TTC and study report to the Transmission Service Provider more than seven, but not more than 14 calendar days after the report was finalized. | The Transmission Operator provided the TTC and study report to the Transmission Service Provider more than 14, but not more than 21 calendar days after the report was finalized. | The Transmission Operator provided the TTC and study report to the Transmission Service Provider more than 21, but not more than 28 calendar days after the report was finalized. | The Transmission Operator provided the TTC and study report to the Transmission Service Provider 28 or more calendar days after the report was finalized. |
| R5. | N/A | N/A | N/A | The Transmission Service Provider did not use all the elements defined in R5 when determining firm ETC, or used additional elements. |
| R6. | N/A | N/A | N/A | The Transmission Service Provider did not use all the elements defined in R6 when determining non-firm ETC, or used additional elements. |
| R7. | N/A | N/A | N/A | The Transmission Service Provider did not use all the elements defined in R7 when determining firm ATC, or used additional elements. |
| R8. | N/A | N/A | N/A | The Transmission Service Provider did not use all the elements defined in R8 when determining non-firm ATC, or used additional elements. |